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EXAMINER

ESHETE, ZELALEM

ART UNIT	PAPER NUMBER
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3748

DATE MAILED: 09/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No. 10/067,050	Applicant(s) LEMAN ET AL.	
	Examiner Zelalem Eshete	Art Unit 3748	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 March 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-34 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 25-34 is/are allowed.
- 6) ☒ Claim(s) 1-14 and 17-24 is/are rejected.
- 7) ☒ Claim(s) 15 and 16 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>3/25/2005</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This Office Action is in response to the RCE filed on 3/25/2005 and amendment filed on 5/3/2004.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-7, 12, 17, 18, 20-24 rejected under 35 U.S.C. 103(a) as being unpatentable over Kanzaki (6,006,706) in view of Feucht et al. (6,135,073).

Regarding claim 1: Kanzaki discloses an engine control system comprising engine cylinder, an engine piston reciprocatingly disposed in the engine cylinder (see figure 1); a valve operatively associated with the engine cylinder (see numeral 11); a mechanically driven actuator adapted to open the valve (see numerals 8,7,6); a fluidically driven actuator adapted to open the valve, the fluidically driven actuator externally disposed relative to the mechanically driven actuators (see numerals 12,10) at least one sensor associated with the engine and adapted to generate an operation signal representative of an engine operation (see column 8, lines 30 to 35); and

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a controller adapted to receive the operation signal and transmit a control signal to the fluidically driven actuator and opening the valve based on the operation signal (see numeral 5). Kanzaki further discloses the fluidically driven actuator coupled to pressurized hydraulic source (see numeral 13).

Kanzaki fails to disclose the fluidically driven actuator coupled to a high pressure hydraulic fluid source and a low pressure hydraulic fluid source.

However, Feucht teaches the fluidically actuator coupled to a high pressure hydraulic fluid source (see numeral 16) and a low pressure hydraulic fluid source (see numeral 15). Feucht further teaches such arrangement results in recuperation of energy (see abstract).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Kanzaki's device by providing a high pressure and a low pressure fluid source as taught by Feucht in order to achieve recuperation of energy as taught by Feucht.

Regarding claim 2: Feucht discloses the fluidically driven actuator is in constant communication with one of a source of high pressure fluid and a source of low pressure fluid (see figure 1).

Regarding claims 3,4: Kanzaki discloses a controller that is capable of generating the control signal during a compression stroke, intake stroke of the engine (see figure 1).

Regarding claim 5: Kanzaki discloses the valve is an intake valve (see abstract).

Regarding claim 6: Feucht disclose the valve is an exhaust valve (see column 7, lines 20 to 25).

Regarding claim 7: Kanzaki discloses the control signal that is capable of actuating the fluidically driven actuator a predetermined length of time (see figure 1).

Regarding claim 12: Kanzaki discloses the sensor monitors temperature (see column 8, lines 30 to 35).

Regarding claim 17,24: Kanzaki as modified above disclose the claimed invention as recited above wherein the first valve actuator corresponds to the mechanically driven actuator and a second valve actuator corresponds to a fluidically driven actuator; and Feucht further discloses the first source (low pressure) taking up any lash associated with the engine, the second source causing the second valve actuator to open the valve (see column 3, lines 29 to 33).

Regarding claim 18: Feucht discloses the second valve actuator includes an actuator cylinder having an actuator piston reciprocatingly disposed in the actuator cylinder (see figure 1), and a control valve adapted to direct pressurized fluid from one

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of the first and second sources of pressurized fluid to the actuator cylinder (see numerals 20,22).

Regarding claim 20: Feucht discloses the first source of pressurized fluid is a lubrication oil system of the engine (see numeral 15).

Regarding claim 21: Feucht discloses the second source of pressurized fluid is a high pressure rail of the engine (see numeral 16).

Regarding claim 22: Feucht disclose the valve is an exhaust valve (see column 7, lines 20 to 25).

Regarding claim 23: Kanzaki discloses the valve is an intake valve (see abstract).

3. Claims 13,14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Feucht in view of Shinojima (5,611,304).

Regarding claim 13: Feucht discloses an engine valve actuator, comprising: an actuator cylinder having a fluid passage (see figure 1); an actuator piston reciprocatingly disposed in the actuator cylinder (see figure 2); and a control valve operatively

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associated with the actuator cylinder (see numeral 20), said control valve having a "housing", said housing receiving low pressure fluid from a low pressure fluid inlet (see numeral 15) and receiving high pressure fluid from a high pressure fluid inlet (see numeral 16), said housing having a fluid outlet (see numeral 21), a "plunger" having first and second ends reciprocatingly disposed in the "housing" (see numeral 20), the plunger being movable between a first position at which the low pressure fluid inlet is in communication with the fluid outlet, and a second position at which the high pressure fluid inlet is in communication with the fluid outlet, the fluid outlet being in fluid communication with the actuator cylinder fluid passage (see figure 1).

Feucht fails to specifically disclose the "structural" implementation of the control valve diagram.

However, Shinojima disclose the structural realization of a control valve that is shown by a diagram (see figure 9).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to structurally realize Feucht's control valve by using the structural implementation of the control valve as taught by Shinojima in order to conserve energy by utilizing the stored energy in the spring.

Regarding claim 14: Shinojima discloses (see figure 9) an electromagnetic device proximate the plunger first end (see numeral 56), and a spring proximate the plunger second end (see numeral 57), said plunger being movable to the first position

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upon deactuation of the electromagnet device, said plunger being movable to the second position upon actuation of the electromagnetic device (see figure 9).

4. Claims 19 rejected under 35 U.S.C. 103(a) as being unpatentable over Kanzaki in view of Feucht, and further in view of Shinojima.

Kanzaki as modified above discloses the claimed invention as recited above; and Feucht further discloses a control valve operatively associated with the actuator cylinder (see numeral 20), said control valve having a "housing", said housing having low pressure inlet (see numeral 15), a high pressure fluid inlet (see numeral 16) and a fluid outlet (see numeral 21); a "spool" reciprocatingly disposed in the "housing" (see numeral 20), the "spool" having first and second ends, the "spool" adapted to move from a first position connecting the low pressure fluid inlet to the fluid outlet to a second position connecting the high pressure fluid outlet to the fluid inlet (see figure 1, numerals 20,15,16), an "electromagnetic" device operatively associated with the spool first end (see numeral 22).

Kanzaki as modified above fails to specifically disclose the "structural" implementation of the control valve diagram.

However, Shinojima teaches the structural realization (housing/spool/electromagnetic device/spring) of a control valve (see figure 9).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to structurally realize the device of Kanzaki as modified above by

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using the structural implementation of the control valve as taught by Shinojima in order to conserve energy by utilizing the stored energy in the spring.

5. Claims 8-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kanzaki in view of Feucht and further in view of Urushihara et al. (6,267,097).

Kanzaki as modified above discloses the claimed invention as recited above; however, fails to disclose sensor monitors engine crank angle and engine speed.

However, Urushihara teaches crank angle sensor/engine speed sensor for use in the control of the valve timing system (see column 3, 35 to 50; figures 13-17; column 3:55 to:60).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Kanzaki by providing crank angle sensor/speed sensor as taught by Urushihara in order to implement the crankshaft position in the calculation of the control signal as taught by Urushihara. It also would have been obvious to generate the control signal in response to a predetermined crank angle for Kanzaki discloses a controller that is capable of generating the control signal during a predetermined crank angle of any value (see figure 1).

Allowable Subject Matter

6. Claims 15,16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
7. Claims 25-34 are allowed.


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zelalem Eshete whose telephone number is (571) 272-4860. The examiner can normally be reached on Monday to Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas Denion can be reached on (571) 272-4859. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Zelalem Eshete
Examiner
Art Unit 3748


THOMAS DENION
SUPERVISORY PATENT EXAMINER
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